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U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF ENTOMOLOGY—BULLETIN No. 125.

L. O. HOWARD, Entomologist and Chief of Bureau.

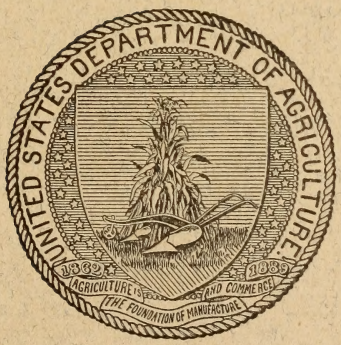
THE FLORIDA FERN CATERPILLAR.

BY

F. H. CHITTENDEN, Sc. D.,

In Charge of Truck Crop and Stored Product Insect Investigations.

Issued October 29, 1913.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
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THE FLORIDA FERN CATERPILLAR.

(*Eriopus floridensis* Guen.)

RECENT INJURIES.

During recent years a species of caterpillar, *Eriopus floridensis* Guen., native to Florida and tropical America has made its appearance in injurious numbers in northern greenhouses, notably in the District of Columbia, in Illinois, and in Ohio. It is apparently restricted to ferns, on which it feeds naturally in its occurrence in the open in the warm South, and it has undoubtedly been introduced into northern greenhouses in ferns from Florida. It is a comparatively large and conspicuous species of caterpillar and, though not closely related to the true cutworms, has the same habit as cutworms of cutting or severing portions of the fern plants, apparently destroying more than it requires for food. The fern growers of the District of Columbia have experienced much trouble in the treatment of this species. Some have had good results, but others were not able to cope with it with the remedies tried, and even found it difficult to control by the laborious method of hand picking. Finally, however, the insect has yielded to this method, and at the time this was written (February, 1913) it was not to be found except in one greenhouse out of upward of a dozen inspected.

DESCRIPTIVE.

THE MOTH.

The moth (fig. 1) belongs to a group of noctuids in which the forewings bear at the sides, above the middle, a projecting area or tooth, forming an outline as shown in the figure. The hind-wings are rather broad and well rounded at the sides. The thorax and abdomen are wide, the latter especially so in the female. The color of the forewings is pale brown, marked with white scales, forming the peculiar and attractive pattern shown in the illustration. The hind-legs are dull buff, edged with dusky brown; the lower surface is paler.

The wing expanse is about $1\frac{1}{8}$ inch and the length of the body about half an inch.

The following description is copied from Sir George F. Hamson's Catalogue of the Noctuidæ:[1]

♀. Head and thorax greyish tinged with rufous and mixed with a few black scales; palpi thickly irrorated with black; frons whitish with black bar above; antennæ with the extremity of basal joint, the basal part of shaft above and below, and the shaft above beyond the sinus black; tegulæ mostly black, edged with grey, with angled grey line near base and grey line at middle; fore and mid tarsi black at extremities; abdomen ochreous tinged with fuscous, the basal crests rufous, the crest on 3rd segment black. Forewing ochreous greyish tinged with rufous, the veins defined by slight blackish streaks; subbasal line represented by double black striæ filled in with whitish from costa and

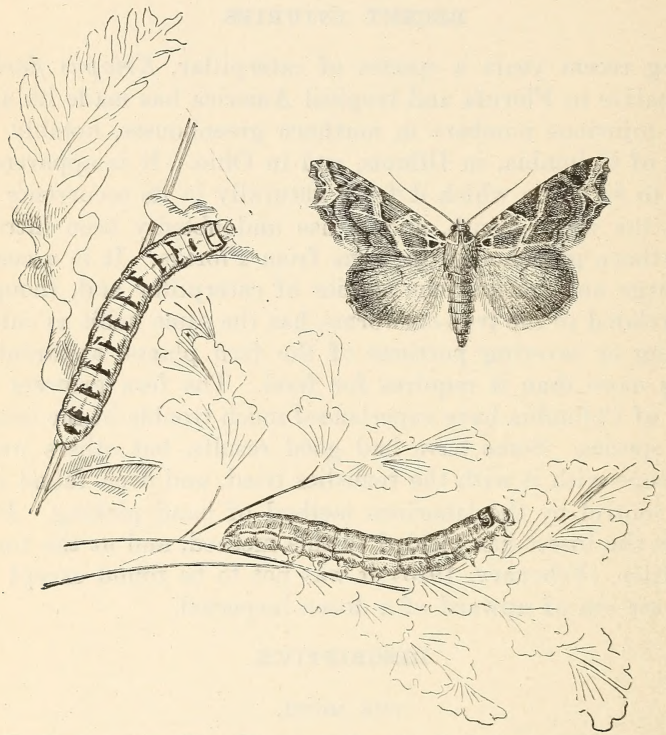

FIG. 1.—Florida fern caterpillar (*Eriopus floridensis*): Moth above; striped larva at left; dark larva at right. Enlarged. (Original.)

cell and with double black striæ before it from cell; antemedial line double, filled in with whitish, angled outwards below costa, acutely angled outwards on base of vein 2, then excurved, a whitish striga before it from submedian fold to vein 1; orbicular with brown centre and whitish annulus, very narrow and slightly angled outwards at median nervure; reniform whitish with white bar on inner edge followed by a brown line, oblique, its lower extremity produced to a hook, a triangular brown patch before it extending to costa; an oblique brown line from beyond lower edge of cell to vein 1, then bent outwards to inner margin; postmedial line double, brown, angled inwards below costa,

[1] Cat. Noct. Brit. Mus., vol. 7, pp. 548–549, London, 1908.

then bent outwards, slightly incurved at discal fold, oblique below vein 4 and incurved at submedian fold; subterminal line whitish, defined on inner side by a triangular brown patch from costa to vein 6, angled inwards above vein 5, then outwards to termen at vein 4 and defined by an oblique blackish mark on inner side, then indistinct, oblique, waved, with a sinuous whitish line before it; the termen red-brown with white line before it slightly defined by black on inner side, incurved from vein 7 to 4 where it angles outwards, then waved; cilia red-brown with yellowish line at base. Hind wing ochreous whitish tinged with red-brown especially on terminal area; a slight brown discoidal bar; cilia whitish; the underside whitish, the costal area tinged with ochreous and slightly irrorated with brown, a brown discoidal bar, postmedian line bent outwards below costa, then crenulate, traces of a diffused subterminal line, three small black spots on termen below apex defined by whitish on inner side.

♀. Ground-color much darker red-brown.

The synonymy is as follows:

Eriopus floridensis Guenée, Noct., vol. 2, p. 292 (1852); Smith, Cat. Noct. N. Amer., p. 309.

Eriopus elegantulus Herrich-Schaeffer, Corresp.-Blatt. zool. min. Ver. Regens, 1868, p. 117.

Callopistria floridensis Guenée (*auct.*).

THE LARVA.

The larva (see fig. 1) is slender, with forelegs and prolegs normal and well developed. The head is small, wider than long, greenish in life, or pale yellow in inflated specimens, with the V-mark strongly marked. While this species is very variable in general color, there is one characteristic mark which extends transversely across the anterior border of the thorax in a blackish line and abruptly backward under the spiracles to the second thoracic segment, and sometimes nearly to the anal segment. The thoracic plate is about twice as wide as long, and not very strongly marked.

The general color varies from yellow to bright green to dark, nearly black. In the palest form the thoracic border may extend nearly to the third joint of the thorax and then cease, or reappear in short, longitudinal dashes just below each spiracle. In the forms which are a little darker these lines are more pronounced, and similar transverse dashes mark the dorsal surface of the last three abdominal segments. In the more strongly marked form, shown in the figure at the left, these transverse bands are of a maroon color and very conspicuous. In most forms, and especially in the dark ones, one of which is shown at the right in the figure, there is a conspicuous longitudinal white line just above the stigmata or spiracles. This is almost lacking in the entirely grown forms. These two extreme color variants are so different that if observed separately they would not naturally be associated with the same insect, the last form presenting a decidedly velvety appearance.

The length is 1⅜ inch (33 mm.) and the width 0.2 inch (4 mm.).

THE PUPA.

The pupa is robust, of the usual shining mahogany-brown color, the posterior apex ending in two minute outcurved spines. The wing-pads are prominent.

The length is five-eighths inch, and the width about half that.

The eggs and immature stages of the larva have not come under observation.

DISTRIBUTION.

The type locality is Florida. Hampson records also Mexico, Guatemala, Costa Rica, Bahamas, Jamaica, Cuba, Haiti, Santa Lucia, St. Vincent, Venezuela, British Guiana, Brazil, and Trinidad. The species is also recorded from Santo Domingo. It is obviously a neotropical form and the only species of its genus occurring in the United States.

INJURIES AND HABITS.

July 10, 1907, this species was reported as a pest by Mr. H. M. Russell (at that time working under the writer's direction), who observed it at Orlando, Fla., attacking the fronds of potted maidenhair fern in that vicinity. It was noticed that the larvæ usually fed at night, although sometimes found feeding during the day. They concealed themselves in the daytime at the base of the ferns or were found resting low down on the stems, and they appeared to have a habit of crawling up the stems and eating off several leaflets on one side, thus spoiling the beauty of the plants. The larvæ observed began to transform to pupæ August 1.

During September of the same year Mr. Bartos, Mr. J. E. Watson, and Mr. F. H. Kramer, of Anacostia, D. C., made complaint that this caterpillar was injurious to several species of ferns in greenhouses. On September 24 Mr. C. H. Popenoe, an entomological assistant in this bureau, was detailed to obtain additional specimens and make observations on the habits of the insect and the conditions of the greenhouses. Larvæ were obtained in different stages, chiefly between half-grown and nearly grown specimens. They were feeding in the afternoon on the upper surface of the leaves. The usual method of attack, as observed, consisted in biting off the midrib leaf one-half to one-third the way up. Maidenhair or Adiantum ferns were attacked either by biting off the leaflets at the tips of the fronds or by biting off the entire frond about 1 inch above the ground. The majority of the larvæ observed were resting either near the tip of the frond of the midrib or else concealed in the stems at the base of the plant. An entire house of Adiantum had been completely stripped of the leaves by the larvæ, and one grower stated that his

fern crop had been damaged to the extent of $1,000. It was stated that the larva would cut the plants entirely bare, and each new leaf would be attacked by two or three larvæ as soon as it appeared. The same grower stated that these cutworms troubled his ferns the previous year and that larvæ, pupæ, and imagos were seen throughout that winter and preyed on the ferns the whole year.

July 3, 1908, Mr. J. E. Watson called at the office, requesting methods for the control of this caterpillar, which was doing great injury to some fern plants (*Nephrolepis whitmani*) in the greenhouse. He estimated that damage to the extent of $4,000 had been caused by the caterpillars during the previous year. During September Mr. Watson and Mr. Bartos made another complaint of this species. Mr. Duder, another florist, also complained of the species. A visit was made on September 28, 1908, and a number of larvæ, mostly full grown, some about to pupate, were secured.

The larva spins a loose cocoon by drawing together dead leaves and particles of earth next to the ground. It sometimes draws together green leaves to spin the cocoon. Though not strictly a nocturnal feeder it shuns bright light and is most often found feeding exposed in the early morning.

The moth is seldom seen by day and when aroused it usually flies down under the benches to seclude itself. Thus many moths are caught in spider webs that abound in dark corners in the greenhouses.

Since the ravages by this species were repeated in 1908 with even greater loss than in 1907, two growers stated that unless some immediate steps could be taken to check the pest the raising of ferns in local greenhouses would be abandoned.

The caterpillars seem to do the greatest damage early in the year, especially during May, but owing to the uniformly warm temperature of the greenhouses, winter as well as summer, there is no time when they are scarce enough to allow the ferns to put out a full head of fronds. They attack the tender leaves, especially the growing tips of young fronds, thus checking any attempt on the part of a plant to replenish the dying fronds with a new growth, and so far stunting it as to render it of no commercial value.

From larvæ obtained in September the moths began to issue October 26, continuing to emerge until November 19. The pupal stage was ascertained to be in three cases 23, 25, and 27 days, respectively, in cool October weather.

October 13, 1909, Mr. H. Walter McWilliams, Griffin, Ga., furnished specimens of this caterpillar, found on ferns, and stated that it cuts the fronds and injured the sale of the plants.

January 18, 1910, Mr. John J. Davis[1] reported this species to be a serious pest on greenhouse ferns in Illinois. It was first reported

[1] Journ. Econ. Ent., vol. 3, p. 183, 1910.

from Onarga, Ill., in 1907, and later from Chicago. Incidentally he mentioned that Mr. A. H. Rosenfeld believed that the same species occurred on ferns in Louisiana. In the twenty-seventh report of the State entomologist of Illinois, dated 1912 and received by the writer March 10, 1913, after the present bulletin had left his hands, an article appears on this subject by Mr. Davis, who is now in the employ of this bureau. He mentions injury to ferns near Chicago, Ill., gives notes on life history, and adds descriptions of all forms, with illustrations of larva, pupa, moth, and sexes. In remarks on remedies he states what we have already learned, that arsenicals can not be applied to ferns in sufficient strength to kill this so-called cutworm, because they are apt to adhere to the surface in such a way as to make it difficult to handle the plants. Poisoned baits are also mentioned, together with pyrethrum and nicotine preparations.

July 21, 1911, Dr. Thaddeus McLaughlin, Springfield, Ohio, furnished specimens of this species, stating that it had destroyed some fine ferns.

What appears to be the first record of the food habit of this species was made in the Yearbook of the Department of Agriculture for 1908 (p. 578) and reads as follows:

> The Florida fern caterpillar (*Callopistria floridensis* Guen.) has been injurious in local greenhouses, one florist reporting damage to his ferns to the extent of $4,000.

NATURAL ENEMIES.

Ichneumon extrematis Cress.—This ichneumon fly, which is of moderate size, black, lightly marked with white, was reared from a pupa of the Florida fern caterpillar from Anacostia, D. C., September 26, 1907. It was seen in the act of issuing from a number of pupal cases, showing a characteristic exit hole. This parasite and two other species were seen flying about the infested greenhouses.

Sargaritis sp.—This small ichneumonid parasite (Chttn. No. 2117[00]) was reared from *Eriopus floridensis* from Anacostia, D. C., September 30, 1907.

A tachinid fly attacks this species, a single specimen, unidentified, having issued from the cocoon of its host August 22, 1907, at Orlando, Fla.

METHODS OF CONTROL.

Many remedies were tried by the growers at Anacostia, some of which were suggested by the writer and others by different persons in the city of Washington. Naturally some of these, which were not advised by entomologists, did not produce the desired effect.

Hellebore.—September 20, 1907, one grower sprayed his entire crop with a strong decoction of hellebore. This was successful in driving away the larvæ but it scalded the foliage of the ferns so badly that many of the plants died. He was advised to use arsenate of lead.

Poisoned bait.—This same grower employed a bait of poisoned bran and molasses, about as advised for cutworms, but without material effect, the caterpillars preferring the ferns.

Carbon bisulphid.—Fumigation with carbon bisulphid was tried by Mr. Watson in June, 1908, but he stated that it had been of no avail in the destruction of this pest. In the same greenhouse, in charge of Mr. Watson, strips of cloth were saturated with carbon bisulphid and placed on the ground about the plants, but although this remedy was sometimes successful it was not entirely reliable since the caterpillars had necessarily to be where they would receive the fumes if they were to succumb.

Hand picking.—The time-worn, laborious, but, if properly pursued, effective remedy of combating the insect by hand measures was employed by numerous growers. One of these reported that the numbers of the caterpillar had been materially reduced by hand picking and poisoning. Another grower made a practice of going over the ferns every day and picking off all the caterpillars that could be seen, thus reducing the numbers of the pest in his greenhouse. It seemed to be the consensus of opinion that the average grower would obtain the best success by hand methods, one of the best methods consisting in shaking each individual plant over the ground and trampling upon the caterpillars as they fall.

Arsenate of lead.—Arsenate of lead was advised, and an assistant was detailed to an infested greenhouse where this remedy was employed, to determine the extent of injury and to advise measures for the possible extermination of the cutworms. On his arrival he was informed that several thousand had been hand picked from the ferns a day or two before and that over 200 had been picked from a space only 5 feet square. The plants had also been sprayed with arsenate of lead at the rate of 2½ pounds to 50 gallons of water, applied twice, but the final result was not reported. Some of the growers complained that lead arsenate, when used in a solution strong enough to kill the caterpillars, would at the same time leave a white deposit on the plants which destroyed their commercial value. Owing to the delicacy of ferns a spray of Paris green strong enough to kill the caterpillars would also burn the foliage. Paris green, properly combined with Bordeaux mixture, should not produce this effect.

Hydrocyanic-acid gas fumigation.—Some of the local growers were advised by the writer to fumigate with hydrocyanic-acid gas, but it was not tried, so far as can be learned. If fumigation by this method were employed several times at about the time when the insects are hatching from the egg, or undergoing their molts, it should assist very materially in reducing the numbers of the pest.

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